

BRITISH COLUMBIA DEPARTMENT OF LANDS
FOREST SERVICE

HON. WILLIAM R. ROSS, K.C., Minister of Lands

BRITISH COLUMBIA TIMBER FOR PRAIRIE FARMS

BEEF CATTLE BARNS

FARM BUILDINGS SERIES
BULLETIN No. 3



THE GOVERNMENT OF
THE PROVINCE OF BRITISH COLUMBIA

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1915.

BRITISH COLUMBIA

LUMBER, SHINGLES

AND OTHER PRODUCTS OF

Douglas Fir

Western Larch

Mountain Western Pine

Western Red Cedar

Western Hemlock

Spruce

Western White Pine



British Columbia Timber for Prairie Farms

GENERAL PURPOSE BARNs

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THE LUMBERING INDUSTRY OF BRITISH COLUMBIA

TO THE PRAIRIE FARMER.

In the forests of British Columbia there stands to-day more than half Canada's supply of commercial timber. Forest surveys made during recent years throughout the Province show 30,000,000 acres of timber ready for the market, and 45,000,000 acres of younger growth that will reach commercial size during the present century. The present merchantable stand is estimated at 400,000,000,000 feet board measure.

Taught by the experience of older countries, British Columbia has adopted a vigorous conservation policy and is carefully protecting her vast forest areas from fire and misuse.

The manufacture of lumber and other wood products is the most important industry of this forest Province. Each year 1,500,000,000 feet of timber is cut to supply the sawmills, pulp and paper mills, and other wood-using factories west of the Canadian Rockies. But the forests produce more wood each year than the mills can find markets for, and so much timber goes to waste. The most of the timber is public property; the prosperity of the Province depends very largely upon the lumbering industry; and it is therefore the duty of the Government to help secure the widest possible market for British Columbia lumber both in foreign countries and in Canada.

The main market for Western lumber to-day is in the Prairie Provinces of Canada. Each farm is, after all, a factory for agricultural produce and needs a well-built plant like any other factory. This means good buildings—a comfortable, convenient house, good barns, granaries, silos, fences, and shelter for machinery. The best material for this is wood. It is cheap, handy to use, warm, sanitary, and it lasts. British Columbia therefore desires to give the citizens of Alberta, Saskatchewan, and Manitoba full information concerning her forest products, asking them to bear in mind that these products are “grown and manufactured in Canada,” and that trade between the Provinces of the Canadian West is the surest foundation for our common prosperity.

The Bulletins.

Valuable bulletins on farm buildings are now being issued by agricultural authorities all over Canada and the United States. The College of Agriculture of the University of Saskatchewan was engaged in this most useful work; the Government of British Columbia entered into a co-operative agreement with the University, and the series of farm bulletins listed on the last page of this booklet is the result. The agricultural information contained herein, and the plans and bills of material were prepared under the immediate supervision of Mr. W. J. Rutherford, Dean of the College of Agriculture, and thus give up-to-date and authoritative views on the agricultural subjects dealt with. The information concerning lumber is supplied by the Forest Service of the Government of British Columbia.

In the building plans, five things are aimed at in particular:—

(1.) That they should be specially designed to meet Prairie conditions.

(2.) That they should be simple and practical to meet the needs of the average farmer.

(3.) That ordinary stock sizes of lumber should be used throughout in order to keep the cost low.

(4.) That it should be easy for the farmer to make additions to the buildings whenever more accommodation should be needed.

(5.) That the details of the plans should be readily alterable to suit individual needs.

The plans printed in these bulletins show enough detail for them to be used as working plans. Any one wishing to obtain large-scale working plans can secure them at cost by writing to the **Chief Forester, Victoria, B.C.** A reference list of bulletins and of sources of agricultural information will be found on the last page.

Note.

While it is understood that the agricultural authorities in Alberta and Manitoba have already published pamphlets on farm buildings, and contemplate issuing others, it is believed that all Prairie farmers will be interested in the British Columbia bulletins, and editions for general distribution on the Prairies have accordingly been printed.

UNIVERSITY OF SASKATCHEWAN.

COLLEGE OF AGRICULTURE

WALTER C. MURRAY, *President*

W. J. RUTHERFORD, *Dean*

Beef Cattle Barns for Prairie Farms

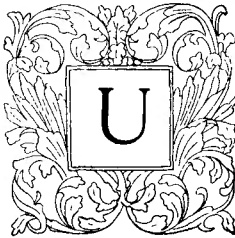
BY

A. R. GREIG, Professor of Agricultural Engineering.

A. M. SHAW, Professor of Animal Husbandry.

BEEF PRODUCTION.

The Situation in Western Canada.



UNTIL a comparatively few years ago the greater part of the beef consumed by the people of eastern America was produced in the great plains region under range conditions. Little thought was given, except by the rancher, to the production of beef. Why should there be? It was cheap at that time—so low in price as to make it impossible for the eastern farmer on his higher priced lands to compete with the rancher in raising it. He was forced to follow some other line and consequently turned his attention to dairying. This was a revenue producer, as his product was a staple article always in demand, and the great cities of the east furnished almost unlimited markets.

As long as plenty of beef in the form of trainloads of cattle from the ranges kept pouring into the eastern and coast markets, all went well and the price of meat remained normal. What was it brought about the change? Why has the price doubled in the last ten years? Is it due to the manipulation of the markets by the packers? We think not. It is due primarily to the decrease in the number of cattle, coupled with the great increase in population during recent years.

During the past decade a steady stream of immigrants has been pouring into Canada, many of them settling in the western provinces. Towns and cities have sprung up on the prairies, and millions of acres of range land have passed into the hand of the farmer. The free range that formerly produced many train-loads of beef each year is now a thing of the past. True, a few foothill ranches still exist, but the great stretches of formerly unlimited range are now curtailed, fenced off and being rapidly turned into farms. And what kind of farms? The large majority of them are devoted to the growing of grain. This is partly due to necessity, partly to choice. In short, the ranks of the consumer have been augmented during the past few years in Canada and in the United States by a vast army of immigrants, a majority of whom are not only non-producers of meat products, but by homesteading and taking up the free lands of the west have deprived the cattle men of their range and practically forced them out of business. This, however, will prove to be eventually in the best interests of the country, because a land of farms and homes is greatly to be preferred to a land given over entirely to ranches. The history of all ranching countries has been that for fifteen or twenty years after the range land is taken up by settlers stock raising is neglected. Their whole attention usually turns to the production of grain. This is natural, as it is an easier and quicker way to make money while the land is new and rich. As time goes on, however, the soil gradually becomes depleted of its fertility and weed infested, and then we find that country going through a transition period or gradually developing a live stock industry instead of the straight grain growing as previously practised. This is the stage that many parts of western Canada are passing through at the present time.

Considering the foregoing as it affects our conditions and remembering that it takes a period of years to increase to any great extent the numbers of cattle in a district, one must come to the conclusion that in all probability beef will remain at fairly high prices for a good many years to come. At the present time large quantities are annually imported into Canada and the United States from New Zealand, Australia and South America.

Probably there never was a greater opportunity than now for the Canadian stockman to engage in the breeding and feeding of beef cattle. Not only is there a good demand for market cattle, but there is a good opening for the man who will engage in breeding pure bred animals of a beef type. One of the greatest drawbacks to the progress of cattle breeding is the continued use of the scrub sire. In some instances this is due to ignorance, in others carelessness and in some others necessity. Many men realize the value of good breeding among cattle, but owing to the fact that nearly all the pure bred sires must be imported or brought from the Eastern provinces, it is difficult for them to secure desirable sires to use on their herds. There is at present practically an unlimited demand at exceptionally good prices for purebred animals of the beef type.

Suitability of Western Canada for Beef Production.

The prairie provinces are better suited in many ways than other parts of Canada for the economical production of beef. In certain sections there is still considerable free range in the form of rough, unoccupied lands unsuitable for tillage purposes. In all parts an abundance of roughage is available. Wheat, oat and barley straw, together with oat hay, native and tame hays and fodder corn, are all quite suitable for winter feeding. The coarse grains, oats and barley, yield well; roots grow to perfection; and in many seasons there is a certain amount of damaged or low grade wheat and screenings that make excellent feed and may often be marketed to advantage in this way. Where such a combination of foodstuffs exist in abundance, the stockman should consider himself fortunate indeed.

Selection of Breeding Stock.

The foundation stock should conform as nearly as possible to the beef type. They may be either Shorthorn, Hereford or Angus or grades of any of these breeds. The cows should be of fair size, straight in their lines, wide, deep and roomy and with a good covering of natural flesh if possible. If good cows of a beef type cannot be secured, the common cows of the country can be used, and if they are bred to the right kind of sire the results will be surprisingly good.

Importance of the Sire.

The lower the grade of cow that is being used as foundation stock the greater the need of a high grade sire. He should under all circumstances be a pure bred and also be as good an individual of his particular breed as can be obtained. He should be low set, thick, deep and meaty with a good covering of natural flesh, and he should indicate, by mellow skin and soft, silky hair that he possesses plenty of quality. He should possess well marked breed characteristics as well as be strongly masculine in appearance. A sire of this kind will invariably have a greater influence on the herd, be more prepotent and more likely to reproduce his own characteristics in his calves, than one that is lacking in these qualities. Good breeding will always tell, and the man who buys the best sire he can possibly afford will win out in the end.

General Management.

Where beef cattle are kept under range or semi-range conditions it is advisable to have the calves dropped in the spring, but where steers from dual or general purpose cows are to be raised they may be dropped in the fall. If hand fed during the winter they will be ready for the grass in the spring, and at the same time a greater profit will be derived from the milk of the dam. Plenty of winter feed should be provided for beef cattle. It is a mistake to skimp their rations during the winter and expect them to gain up and be ready for market early in the summer. Cattle treated in this way will weigh no more when they come out in the spring than when they went into winter quarters, and the summer is half over before they even begin to make gains. This is especially true of calves and yearlings. They should be well treated during the first winter. No better use can be made of the coarse grains than to feed them to cattle of this age. The calves, too, should be weaned at about six months of age and taught to eat grain. This treatment will insure good, thrifty calves and the dams will be in better condition to go through the winter than when the calves are allowed to remain with them.

Two year olds will usually make cheaper gains than older cattle, and an effort should be made to turn them off at this stage. The methods of accomplishing this will differ. Where plenty of

grass is available it can be accomplished practically without the addition of grain. In many cases grain and roughage can be fed to advantage and at the prevailing price of beef will return a greater revenue than when sold as grain or hay.

Housing.

It has been demonstrated many times in Western Canada that it is quite possible to feed cattle without any shelter other than that afforded by a bluff during the winter. Although this is true, the fact remains that a much greater profit can be made when adequate shelter and protection from storm is provided.

These shelters need not be elaborate or expensive. A simple straw shed can be utilized, but where the business of feeding cattle is to be carried on, a permanent building is much to be preferred. A building suitable for this purpose must be comparatively cheap, must provide ample space for the cattle, protection against storms and have convenient feeding arrangements.

A great many tests to determine the relative merits of stall versus yard feeding have been carried out, and the consensus of opinion as far as western steers are concerned, is that the practice of feeding them in loose boxes or sheds is by far the best method.

The Breeding Barns and Feeding Sheds herein described are economical to build, permanent, and efficient as far as comfort of the animals and convenience of feeding is concerned; and while they may not exactly suit every farmer they can easily be modified to meet individual requirements.

BARN PLANS.

Beef Cattle Breeding Barn No. 1.

This barn is designed specially for the stockman who is engaged in breeding pure bred beef cattle, and also to give the farmer intending to develop a herd of that kind an idea as to the type of building that will be satisfactory for the business.

The ground floor plan, 36 feet by 58 feet, is shown in Fig. 2. There are six double stalls 6 feet wide, and two single stalls 3 feet wide. Fixed manger No. 3 as shown in Fig. 15, is used in this barn. Single stalls with swinging steel stanchions (Fig. 14)

could be used if desired, but the double stall with 20-inch partitions is just as safe as far as hooking is concerned, and at the same time leaves all the available space for the use of the cows when lying down.

The two box stalls, 12 feet by 13 feet, and also the two 9 feet by 13 feet, are intended for stabling young and breeding bulls. The mangers in these loose boxes should be solidly built so as to stand the rough usage given them by bulls. Manger 1, Fig. 15, is suitable.

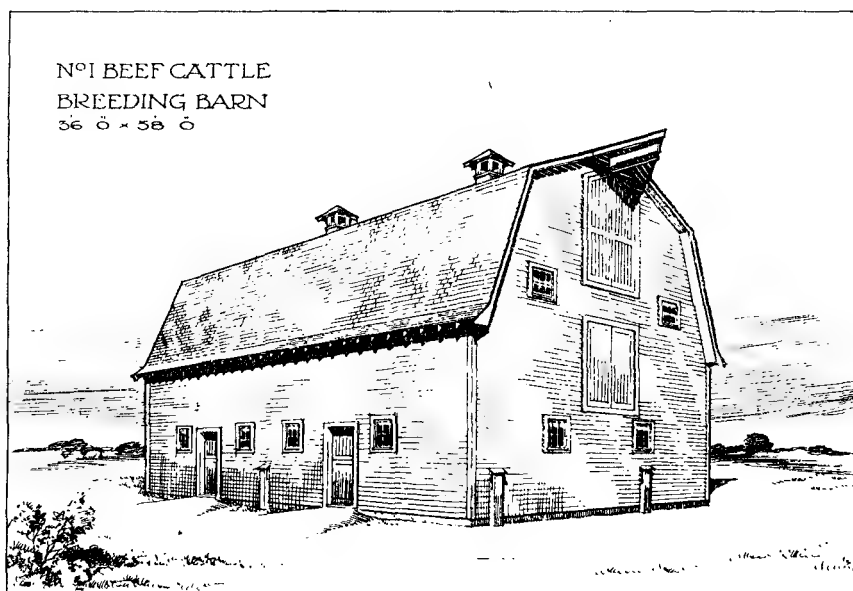


Fig. 1. Designed especially for breeding stock. It is exceptionally warm, on account of the absence of large doors in the stable.

The five smaller box stalls located along one side of the barn are intended for stabling calves of various ages. These stalls are so located that the calves can be taken out to suckle the dam and returned with little trouble. The individual stanchions (Fig. 16) are intended to be used simply while the calves are feeding. The feed room, 8 feet 6 inches by 10 feet, which is placed opposite the central feed alley, contains large feed bins, a stairway to the loft, and two doors, one of which leads outside and is very convenient for the attendant. If a silo is built it should be placed in the



Fig. 2. The arrangement is very compact and convenient and all the available space is utilized.

position indicated, so the silage could be transferred direct to the feed room without additional handling.

Plenty of light is provided in all parts of the stable by the large number of well spaced windows. A litter carrier track is shown running clear around the litter alleys so that box stalls as well as

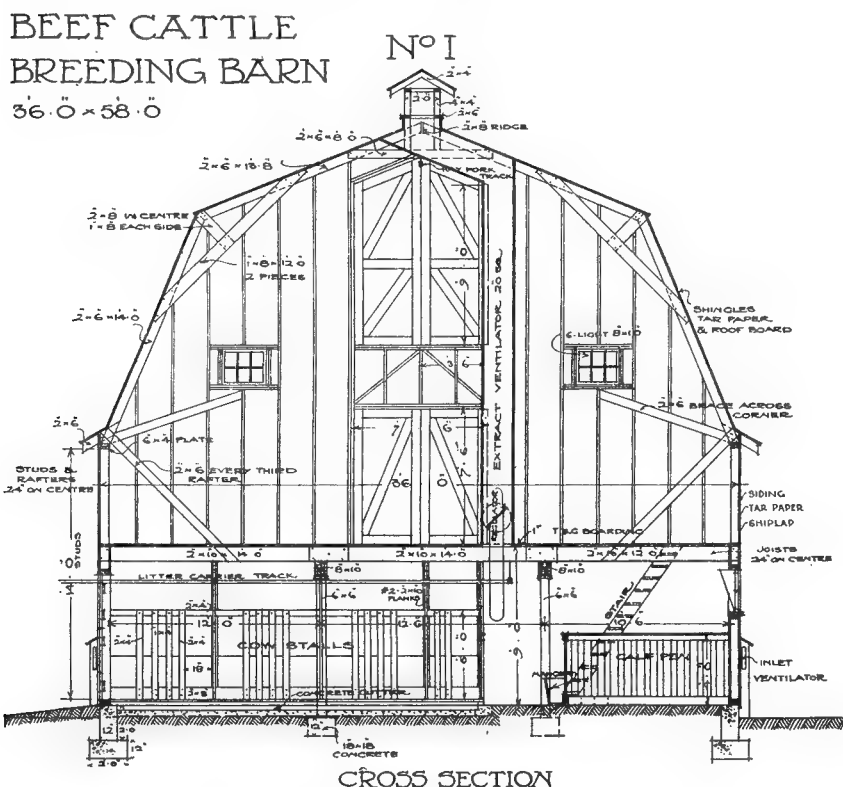


Fig. 3. The cow stalls are very simple in design and serviceable in use.

the rows of cows' stalls can be easily cleaned out. This track could be extended by the addition of a switch along the front of the calf pens at either end. Chutes for putting down feed and bedding are located at the most convenient places. Six fresh air inlets so arranged as to cause no drafts, and two properly placed outlets, take care of the ventilation.

Bill of Materials, Beef Cattle Breeding Barn No. 1.

Framing Lumber

No. of Pcs.	Inches Thick	Inches Wide	Feet Long	Feet. Board Measure	USED FOR
2	6	8	10	80	Hay fork beam, projecting at each end of barn.
4	4	4	8	43	Cupola posts.
60	2	10	14	1,400	Hay floor joists.
16	2	10	14	373	Beams under hay loft joists; 4 pieces spiked together to form 8" x 10" beams.
16	2	10	12	320	
30	2	10	12	600	Hay floor joists.
2	2	10	12	40	Stair strings.
2	2	10	12	40	Cow stall manger bottoms.
1	2	10	12	20	Fixed mangers for box stalls.
6	2	10	12	120	Cow stall manger fronts next feed alley.
6	2	10	10	100	Cow stall manger fronts next feed alley.
12	2	10	10	200	Cow stall divisions.
2	2	10	10	33	Cow stall manger bottoms.
8	2	10	8	107	Beams under hay loft joists, 4 pieces spiked together to form 8" x 10" beams.
2	2	10	8	27	Fixed mangers for box stalls.
2	2	8	16	43	Ridge pole.
3	2	8	14	56	Ridge pole.
* 4	2	8	12	64	Corbels on top of posts, to make 12 pieces 4" x 8" x 2'.
2	2	8	12	32	Cow stall manger bottoms.
2	2	8	12	32	Fixed mangers for box stalls.
2	2	8	12	32	Cow stall manger fronts on stall side.
2	2	8	10	27	Cow stall manger fronts on stall side.
3	2	8	10	40	Stair treads.
2	2	8	10	27	Cow stall manger bottoms.
*16	2	8	8	171	Struts from 1" x 8" braces to joint of upper and lower rafters (see detail B.B., Fig. 13).
10	2	8	8	107	Fixed mangers for box stalls.
6	2	8	6	48	Fixed mangers for box stalls.
4	2	6	20	80	Diagonal braces to end wall studs.
8	2	6	20	160	Studs, end walls.
4	2	6	18	72	Studs, end walls.
36	2	6	16	576	Studs, end walls.
*40	2	6	16	640	Plates and sills, doubled to make 4" x 6".
* 4	2	6	16	64	Rafters for projecting roof over hay fork beam.
18	2	6	14	252	Posts under beams; 3 pieces spiked together to make 12 posts 6" x 6", 7 feet long.
62	2	6	14	868	Studs, side walls.
16	2	6	14	224	Trimmings to window openings.
128	2	6	14	1,792	Rafters.
16	2	6	12	224	Rails to box stall partitions.

Framing Lumber—Continued

No. of Pcs.	Inches Thick	Inches Wide	Feet Long	Feet, Board Measure	USED FOR
2	2	6	14	28	Rails to box stall gates.
4	2	6	12	48	Studs, end walls.
*10	2	6	12	120	Ribbon under joists, notched 1" into studs.
4	2	6	12	48	Braces across corners of hay loft.
4	2	6	10	40	Braces across corners of hay loft.
14	2	6	10	140	Gate and corner posts for box stalls.
22	2	6	10	220	Braces on every third rafter from roof plate to floor joists.
2	2	6	10	20	Rails to box stall partitions.
2	2	6	10	20	Cupola stool.
16	2	6	10	160	Lookout rafters, to cut 64 pieces 2' 6" long.
18	2	6	10	180	Studs, end walls.
8	2	6	8	64	Studs, end walls.
6	2	6	8	48	Extra studs at ground floor openings.
30	2	6	8	240	Collar ties.
8	2	6	8	64	Rails, box stall partitions.
4	2	6	8	32	Locking bars to hay loft doors.
*1	2	4	16	11	Cupola plate.
2	2	4	16	21	Cupola rafters.
7	2	4	14	65	Upright slats to cow stalls.
2	2	4	12	16	Head rails to cow stalls.
2	2	4	10	13	Head rails to cow stalls.
34	2	4	10	227	Gate and corner posts to calf pens and cow stall mangers.
20	2	4	10	133	Rails to calf pen partitions.
*30	2	2	20	200	Bridging to joists.
*20	2	2	16	107	Corner framing to ventilator shafts and feed bins.
6	1	12	4	24	Inlet ventilator fronts.
2	1	10	16	27	Calf manger fronts.
2	1	10	12	20	Fixed mangers for box stalls.
1	1	10	10	8	Inlet ventilator tops.
4	1	10	8	27	Fixed mangers for box stalls.
*15	1	8	16	160	Cleats from 1" x 8" braces to joint of upper and lower rafters (see detail B.B., Fig. 13).
2	1	8	16	21	Calf manger fronts.
120	1	8	12	960	Braces on both sides of all rafters.
3	1	8	12	24	Manger divisions.
7	1	8	10	47	Calf manger divisions.
4	1	6	16	32	Rails to calf stanchions.
30	1	6	8	120	Uprights to calf pen partitions.
1	1	6	12	6	Fixed mangers for box stalls.
1	1	6	12	6	Rails to calf pen gates.
32	1	6	10	160	Uprights to box stall partitions, to cut 64 pieces 5' 0" long.
5	1	6	10	25	Uprights to box stall partitions, to cut 20 pieces 2' 6" long.

Framing Lumber—Continued

No. of Pcs.	Inches Thick	Inches Wide	Feet Long	Feet. Board Measure	USED FOR
12	1	6	10	60	Uprights to box stall gates.
2	1	6	8	8	Fixed mangers for box stalls.
8	1	6	8	32	Rails to calf stanchions.
3	1	6	8	12	Rails to calf pen gates.
20	1	6	4	40	Uprights to calf pen gates.
12	1	6	4	24	Inlet ventilator sides.
7	1	4	14	33	Upright slats to cow stalls.
*12	1	2	16	32	Door and window stops.
*20	1	2	14	47	Door and window stops.
Total Framing Lbr.				13,354	

Finish Lumber

6	2	8	10	80	Window sills.
6	2	6	8	48	Door frames, hay loft.
3	2	6	14	42	Door frames, ground floor.
1	2	6	12	12	Door frames, ground floor.
2	2	6	12	24	Door braces, hay loft.
2	2	6	10	20	Door braces, hay loft.
6	2	6	10	60	Door frames, hay loft.
8	2	6	8	64	Door stiles, hay loft.
10	2	6	8	80	Door rails, hay loft.
4	2	6	8	32	Door braces, hay loft.
3	2	6	8	24	Door braces, ground floor.
4	2	6	8	32	Door rails, ground floor.
1	2	6	6	6	Door rails, feed room.
12	1	12	4	48	Window cheeks.
* 8	1	8	16	85	Frieze at eaves.
8	1	8	14	75	Fascia at gable.
2	1	8	10	13	Feed chutes.
4	1	6	16	32	Corner boards.
2	1	6	16	16	Door casing.
4	1	6	14	28	Door casing.
* 5	1	6	14	35	Ridge cover boards.
8	1	6	14	56	Frieze at gables.
2	1	6	12	12	Door casing.
6	1	6	10	30	Door casing.
4	1	6	10	20	Feed chutes.
17	1	6	10	85	Window lining.
4	1	5	16	27	Corner boards.
* 5	1	5	14	29	Ridge cover boards.
17	1	4	12	68	Window casing.
Total Finish Lumber				1,183	

***Random lengths** to make up the same total number of lineal feet will answer for these items, and are cheaper than specified lengths.

Short lengths (less than 10 ft.) are cheaper than long lengths (10 ft. and over), and where they will answer the purpose it pays to specify them. For example, it is cheaper to buy 6 and 8 foot lengths than to cut them out of 12 and 16 foot lengths.

- 520 feet, board measure, 2" plank floor for cow stalls and stall ends, 4' high, next litter alley.
- 2,500 feet, board measure, 1" T. and G. fir or larch flooring, for hay loft floor.
- 3,800 feet, board measure, 1" roof boarding, laid close. (Note.—If open boarding is desired, 2,600 feet, board measure, will suffice.)
- 1,000 feet, board measure, 1" shiplap, for ventilator shafts and feed bins.
- 2,300 feet, board measure, 1" shiplap, for lining ceilings of ground floor.
- 1,900 feet, board measure, 1" shiplap, for inside lining of walls of ground floor.
- 5,000 feet, board measure, 1" shiplap, for covering all outside walls.
- 450 feet, board measure, 1" V-joint, in 8-ft., 10-ft. and 14-ft. lengths, for all doors.
- 5,500 feet, board measure, siding.
- 36,000 British Columbia Red Cedar edge grain shingles (144 bundles).
- 21 rolls of tar paper.
- 16 sashes, 6 lights, 8" x 10"; outside measurement, 2' 4½" wide x 2' 1" high.
- 1 sash, 4 lights, 8" x 10"; outside measurement, 1' 8½" wide x 2' 1" high.

Hardware

- 260 lbs. 4" common nails.
- 60 lbs. 2½" flooring nails.
- 250 lbs. 2½" common nails.
- 120 lbs. 2" flooring nails, for siding.
- 180 lbs. 1¼" shingle nails, galvanized, zinc clad, or cut iron.
- 28 bolts, ½" x 4½", for cow stall uprights.
- 33 bolts, ⅝" x 10", with large double washers, for bolting sills to concrete foundation.
- 18 bolts, ⅜" x 6", for calf stanchion bottom rails.
- 18 bolts, ⅜" x 2", for calf stanchion bar.
- 4 iron bolts, ½" x 6", for locking bars to doors.
- 3 pieces ⅜" x 1¼" iron bar, 5 feet long, for calf stanchions.
- 2 pieces ⅜" x 1¼" iron bar, 8 feet long, for calf stanchions.
- 8 iron brackets, for locking bars.
- 10 pairs 18" T hinges, for loft doors.
- 5 pairs 12" T hinges, for ground floor doors.
- 10 pairs 8" T hinges, for pen gates.
- 3 pairs 6" T hinges, for trap doors.
- 15 pairs 4" T hinges, for windows and feed bin lids.
- 13 window fasteners.
- 14 cow ties.
- 1 thumb latch, for feed room door.
- 2 barn door latches.
- 12 barrel bolts, 6", for gates.
- 2 round iron rods, ⅜" x 24" long, for pivots to dampers in ventilating shafts.
- 160 bags cement, for foundations and gutters.
- 30 yards gravel, for foundations and gutters.

Note.—This bill of material includes everything necessary for the building itself, but does not include anything for scaffolding. Alternative quantities are given for two methods of roof boarding—close and open—the choice being left to the builder. Close boarding is better where there is no hay loft over the animals; where hay lofts are shown, open boarding will answer.

Beef Cattle Feeding Shed No. 2.

This building will accommodate fifty head of cattle. Fig. 5 shows the ground floor 24 feet by 60 feet, and Fig. 6 the cross section and an enlarged detail of the mangers. A roller door 10 feet by 10 feet at each end allows a team and wagon to be driven in with bedding or for removing manure. In many cases these end doors could be left open a good part of the time and the steers

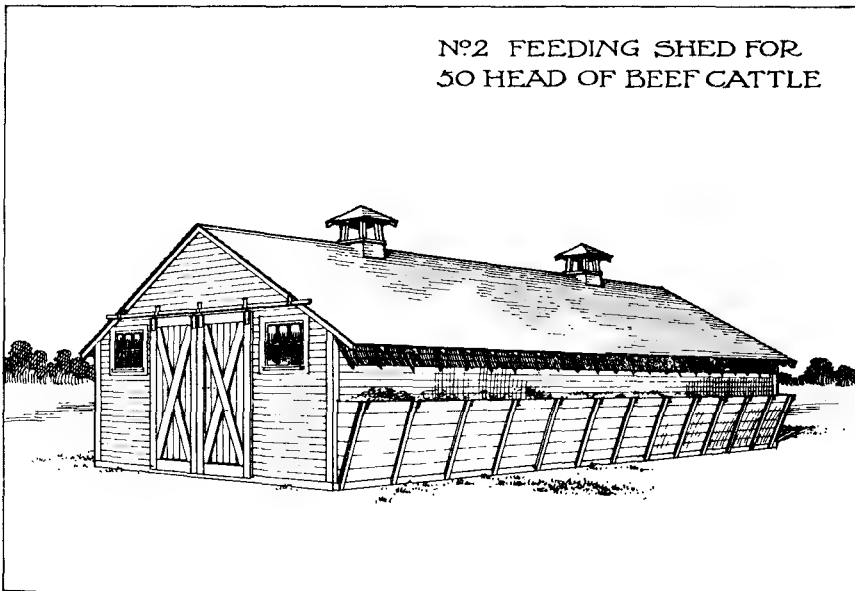
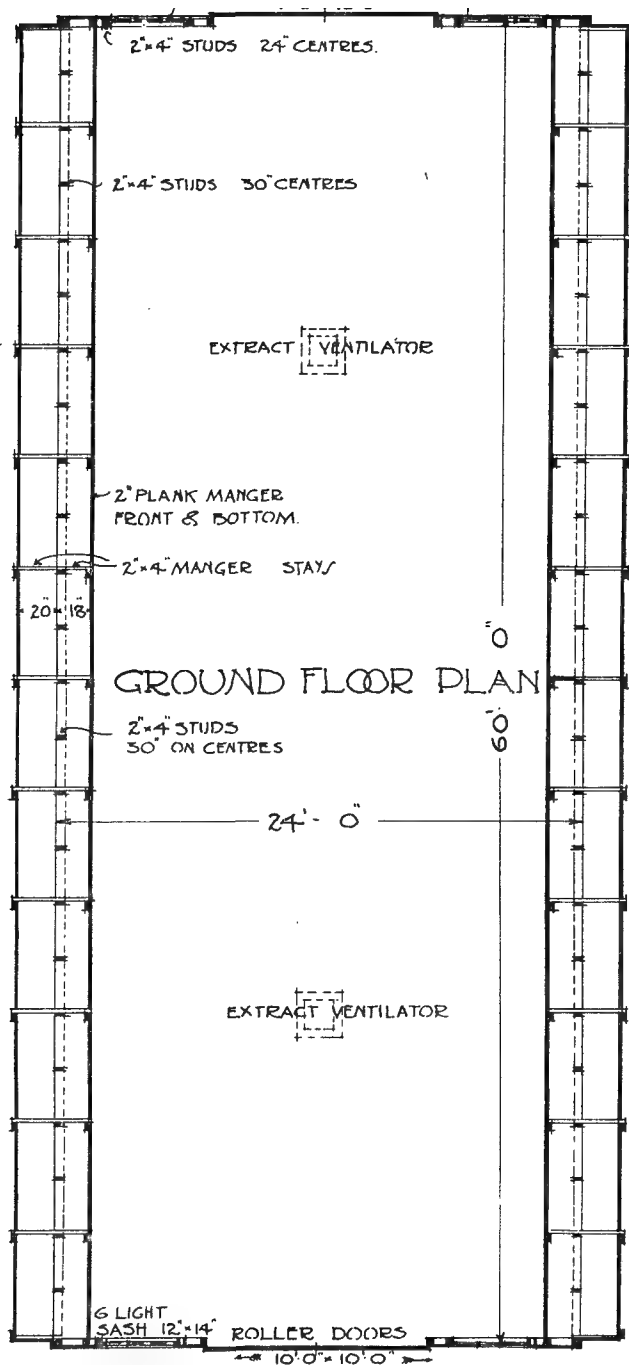


Fig. 4. A very cheap and serviceable type of feeding shed. Wagons can be used inside and out for handling feed, bedding, and manure.

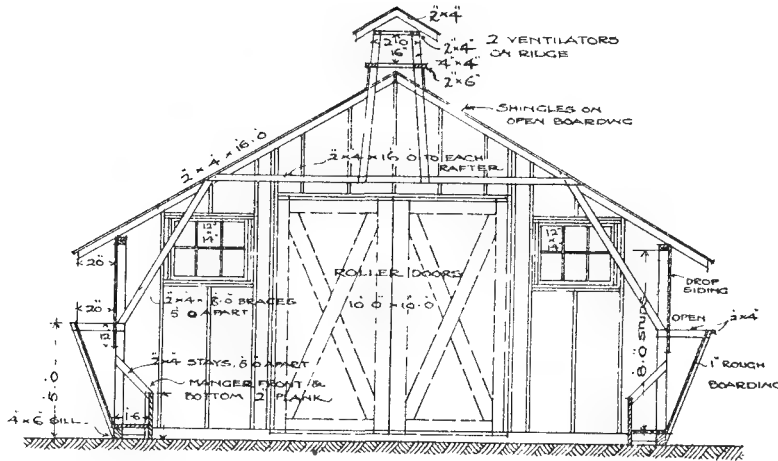
allowed to come and go at will. The mangers are ranged along either side and run the entire length of the building, and are so built that the fodder can be fed from a wagon on the outside of the building. By allowing the siding on the walls to drop about a foot below the level of the top of the manger (See cross section, Fig. 6), a good deal of direct draft is eliminated and the fodder is held in place, making it necessary for the steers to pull it down as required. Having mangers on each side tends to make the building more drafty than if they were placed on one side only, but it gives twice



No 2 FEEDING SHED FOR 50 HEAD OF BEEF CATTLE

Fig. 5. The cattle have the run of the entire floor space inside. The end doors can be left open except in severe weather.

the feeding capacity. Where the fronts of the mangers are run well up, 5 inches or more, the draft is eliminated to a large extent. Lids or manger covers could be put on if desired, but as they are hard to keep in order they are not advised. The drip from the eaves will not amount to much in most parts of the Canadian west during the winter months, when the shed is likely to be in use. If eavetroughs and a cistern were used, however, a good deal of water could be collected from a building of this kind at certain seasons of the year.



CROSS SECTION

Nº2 FEEDING SHED FOR 50 HEAD OF BEEF CATTLE.

Fig. 6. The mangers are filled from the outside and will hold several days' supply of roughage.

Bill of Materials, Feeding Shed No. 2.

Framing Lumber

No. of Pcs.	Inches Thick	Inches Wide	Feet Long	Feet, Board Measure	USED FOR
4	4	6	16	128	Sills.
4	4	6	12	96	Sills.
4	4	4	14	75	Corner posts, roof ventilators.
* 8	2	10	16	213	Manger bottoms.
* 8	2	8	16	171	Manger bottoms.
*24	2	8	16	512	Manger fronts.
4	2	8	4	21	Window sills.
4	2	6	16	64	Ridge pole.
2	2	6	10	20	Cupola stool.
20	2	6	10	200	Framing for roller doors.
*15	2	4	16	160	Roof plates, doubled, to make 4" x 4".
54	2	4	16	576	Rafters.
27	2	4	16	288	Collar ties.
*26	2	4	16	277	Framing for self feeding manger.
4	2	4	16	43	Studs, end walls.
8	2	4	14	75	Studs, end walls.
11	2	4	12	88	Studs, end walls.
8	2	4	10	53	Studs, end walls.
4	2	4	10	27	Roller door track fixing.
8	2	4	10	53	Guides on sills for roller doors.
54	2	4	8	288	Studs, side walls.
4	2	4	8	21	Studs, end walls.
27	2	4	8	144	Braces from side walls to collar ties.
4	2	4	8	21	Cupola rafters.
2	2	4	8	11	Cupola plates.
* 8	1	8	16	85	Frieze at eaves.
4	1	8	16	43	Fascia at gables.
* 4	1	6	16	32	Ridge cover boards.
4	1	6	16	32	Frieze at gables.
2	1	6	12	12	Door casing.
4	1	6	10	20	Door casing.
6	1	6	10	30	Door lining.
4	1	6	10	20	Cover boards for sliding door tracks.
4	1	6	10	20	Corner boards.
* 4	1	5	16	27	Ridge cover boards.
4	1	5	10	17	Corner boards.
4	1	4	16	21	Window casing.
Total Framing Lbr. 3,984					

***Random lengths** to make up the same total number of lineal feet will answer for these items, and are cheaper than specified lengths.

Short lengths (less than 10 ft.) are cheaper than long lengths (10 ft. and over), and where they will answer the purpose it pays to specify them. For example, it is cheaper to buy 6 and 8 foot lengths than to cut them out of 12 and 16 foot lengths.

- 700 feet, board measure, 1" shiplap, for back to self-feeding mangers.
- 1,300 feet, board measure, drop siding.
- 1,400 feet, board measure, roof boarding, laid open.
- 20,000 British Columbia Red Cedar edge grain shingles (80 bundles).
- 250 feet, board measure, 1" V-joint, in 10-ft. lengths, for doors.
- 4 sashes, 6 light, 12" x 14"; outside size, 3' 4½" wide x 2' 9" high.

Hardware

- 40 lineal feet single sliding door track.
- 8 door hangers, for sliding doors.
- 4 hooks and eyes, 6".
- 100 lbs. 4" common nails, for framing.
- 50 lbs. 2½" common nails, for shiplap and roof boarding.
- 35 lbs. 2" flooring nails, for siding.
- 100 lbs. 1¼" shingle nails, best galvanized, zinc clad, or cut iron.

Note.—This bill of material includes everything necessary for the building itself, but does not include anything for scaffolding.

Beef Cattle Feeding Barn No. 3.

This steer feeding barn is 38 feet by 80 feet and will accommodate approximately 75 head, as indicated on the plan (Fig. 8). The ground floor is divided into three large pens, a feed room, and a central feeding alley 5 feet wide, which runs through from end to end and from which all the cattle can be easily and quickly fed. The feed room is equipped with four feed bins, connected by chutes to larger grain bins in the loft. A stairway, conveniently located in one corner, affords easy access to the loft. A passage 4 feet wide is left in the centre of the feed room between the bins, so that

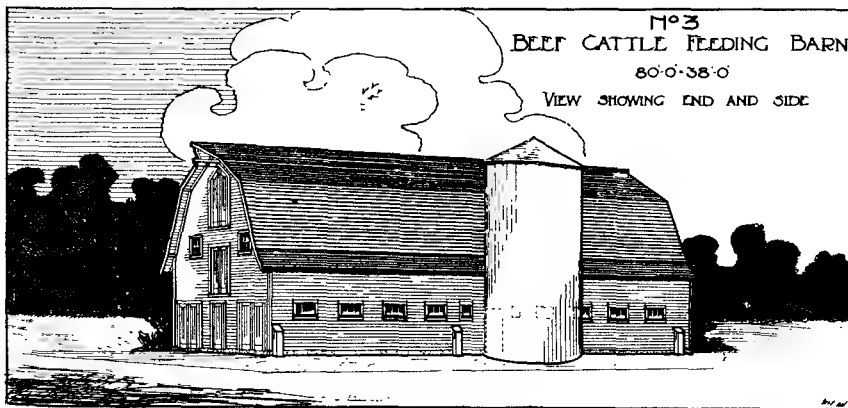


Fig. 7. A more elaborate feeding barn, with feeding room for 75 head, and loft room for an entire winter's supply of hay.

BEEF CATTLE FEEDING BARN 7°3

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SCALE -

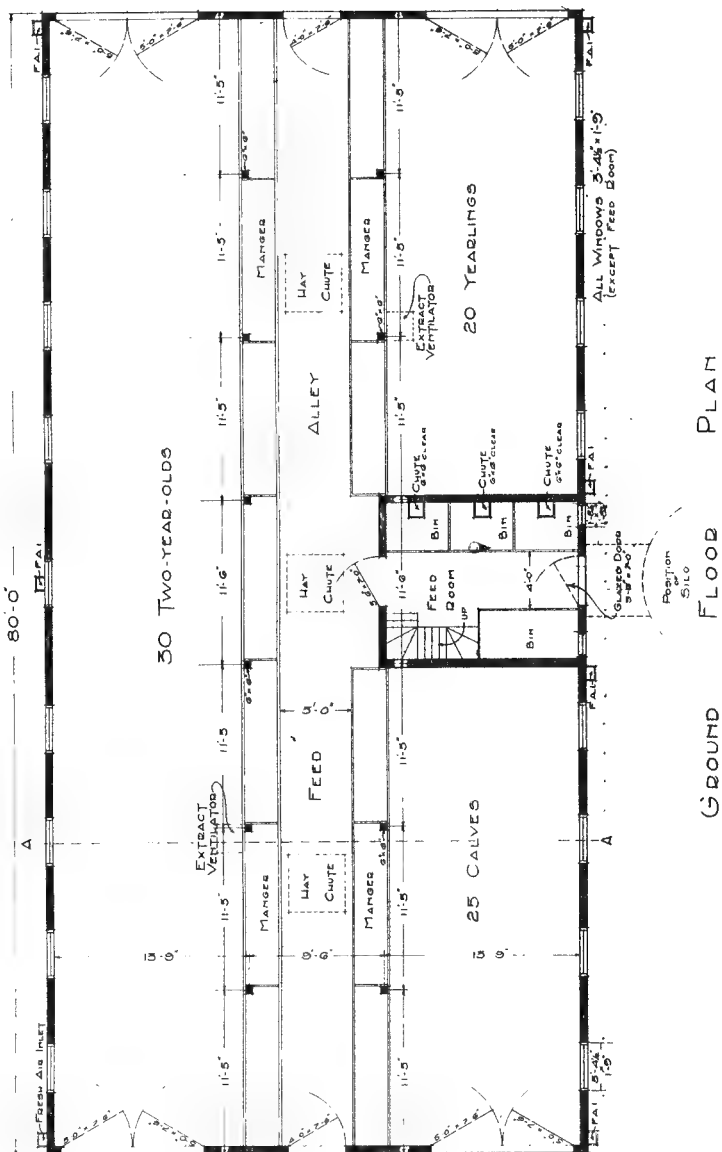


Fig. 8. The arrangements for handling feed and manure are very convenient. Part of the stable could be used for housing sheep or other animals instead of cattle if desired.

broken or strained by the high winds of the prairies. The door sill should be raised above the level of the floor so that accumulated litter will not obstruct the doors.

The mangers are simple in construction and continuous. They should have tight bottoms so that meal or roots can be fed in them without waste. They are 2 feet high on the side next the steers, 1 foot 6 inches wide at bottom, and 3 feet high in front; the front is flared so as to make the manger 2 feet 6 inches wide at the top. Earth floors are best for the pens. The feed room should have a floor of plank or concrete. The loft is provided with end doors and a track for a hay fork or sling, and large quantities of roughage in the form of oat hay, oat sheaves or straw can be stored in it. A great deal of oat and wheat straw can be utilized by blowing it directly from the machine into the loft, where it will be in the best possible condition for feeding purposes.

The ventilation system is the same as in Barn No. 1.

Bill of Materials, Beef Cattle Feeding Barn No. 3.

Framing Lumber

No. of Pcs.	Inches Thick	Inches Wide	Feet Long	Feet, Board Measure	USED FOR
2	6	8	10	80	Hay fork beams projecting at each end of barn.
8	4	4	10	107	Cupola posts.
82	2	10	16	2,187	Joists, hay loft.
2	2	10	16	53	Stair strings.
42	2	10	12	840	Beams under joists.
41	2	10	10	683	Joists, hay loft.
* 6	2	8	16	128	Ridge pole.
*21	2	8	8	224	Struts from 1" x 8" braces to joint of upper and lower rafters.
6	2	8	8	64	Stair treads.
4	2	6	22	88	Studs, end walls.
4	2	6	20	80	Diagonal braces to end wall studs.
4	2	6	20	80	Studs, end walls.
4	2	6	18	72	Studs, end walls.
28	2	6	16	448	Studs, end walls.
17	2	6	16	272	Trimming around window openings.
*10	2	6	16	160	Ribbon under joists, notched 1" into studs.
*20	2	6	16	320	Sills and plates.
*18	2	6	14	252	Sills and plates.
172	2	6	14	2,408	Rafters.
4	2	6	14	56	Corner braces, hay loft.
82	2	6	14	1,204	Studs, side walls.
10	2	6	14	140	Studs, end walls.
4	2	6	12	48	Studs, end walls.
4	2	6	12	48	Corner braces, hay loft.
82	2	6	12	984	Braces from lower rafters to wall studs.
*19	2	6	12	228	Sills and plates.
26	2	6	10	260	Braces from every third rafter from roof plate to hay loft floor joists.
2	2	6	10	20	Cupola stool.
43	2	6	10	430	Lookout rafters at eaves, to cut 86 pieces 5' 0" long.
20	2	6	10	200	Studs, end walls.
8	2	6	8	64	Studs, end walls.
36	2	6	8	288	Posts under beams.
41	2	6	8	328	Collar ties.
8	2	6	8	64	Locking bars for loft doors.
* 5	2	4	16	53	Bearers under manger bottoms.
1	2	4	16	11	Cupola plate.
13	2	4	12	104	Head rails over mangers.
26	2	4	10	173	Framing for mangers.
20	2	4	8	107	Studs for feed room walls.
4	2	4	8	21	Cupola rafters.
*30	2	2	20	200	Bridging to joists.

Framing Lumber—Continued

No. of Pes.	Inches Thick	Inches Wide	Feet Long	Feet, Board Measure	USED FOR
*15	2	2	16	80	Corner framing for ventilator shafts and feed bins.
*10	2	2	14	47	Corner framing for ventilator shafts and feed bins.
6	1	12	4	24	Inlet ventilator fronts.
1	1	10	10	8	Inlet ventilator tops.
164	1	8	14	1,531	Braces on both sides of upper and lower rafters.
*41	1	8	8	219	Cleats from braces to joint of upper and lower rafters (see detail B.B., Fig. 13).
*43	1	8	8	229	Cleats on both sides of lower roof braces and studs (see detail A.A., Fig. 13).
12	1	6	4	24	Inlet ventilator sides.
Total Framing Lbr. 15,739					

Finish Lumber

6	2	8	16	128	Door frames.
5	2	8	12	80	Door frames.
11	2	8	8	117	Window sills.
3	2	6	16	48	Door frames.
2	2	6	12	24	Braces, loft doors.
6	2	6	10	60	Door frames.
8	2	6	10	80	Stiles, loft doors.
2	2	6	10	20	Braces, loft doors.
8	2	6	10	80	Rails, ground floor doors.
4	2	6	10	40	Braces, single doors.
8	2	6	8	64	Stiles, loft doors.
10	2	6	8	80	Rails, loft doors.
4	2	6	8	32	Braces, loft doors.
16	2	6	8	128	Stiles, ground floor doors.
8	2	6	8	64	Braces, ground floor doors.
4	2	6	8	32	Rails, single doors.
17	1	12	8	136	Window checks.
*18	1	8	16	192	Frieze to side walls and gables.
1	1	8	14	9	Door frames.
8	1	8	14	75	Fascia at gables.
4	1	8	10	27	Feed chutes.
* 6	1	6	16	48	Ridge cover boards.
4	1	6	16	32	Corner boards.
1	1	6	16	8	Door casings.
1	1	6	14	7	Door casings.
4	1	6	12	24	Door casings.
6	1	6	10	30	Door casings.
8	1	6	10	40	Feed chutes.

Finish Lumber—Continued

No. of Pes.	Inches Thick	Inches Wide	Feet Long	Feet, Board Measure	USED FOR
17	1	6	8	68	Window lining.
18	1	6	8	72	Door casings.
2	1	6	6	6	Window lining.
* 6	1	5	16	40	Ridge cover boards.
6	1	5	16	27	Corner boards.
4	1	4	16	21	Window casing.
17	1	4	14	79	Window casing.
2	1	4	10	7	Window casing.
Total Finish Lumber 2,025					

***Random lengths** to make up the same total number of lineal feet will answer for these items, and are cheaper than specified lengths.

Short lengths (less than 10 ft.) are cheaper than long lengths (10 ft. and over), and where they will answer the purpose it pays to specify them. For example, it is cheaper to buy 6 and 8 foot lengths than to cut them out of 12 and 16 foot lengths.

1,924 feet, board measure, 2" plank, in 12-ft. lengths, for manger fronts, backs, and bottoms.

1,100 feet, board measure, 1" shiplap, for ventilator shafts.

4,000 feet, board measure, 1" T. and G. fir or larch flooring.

3,700 feet, board measure, 1" shiplap, lining for ceiling of ground floor.

2,200 feet, board measure, 1" shiplap, lining on inside of walls, ground floor.

800 feet, board measure, 1" shiplap, lining to walls of feed room and feed bins.

5,700 feet, board measure, 1" shiplap, lining on outside of walls.

5,400 feet, board measure, 1" roof boarding, laid close. (Note.—If open boarding is desired, 3,600 feet board measure will suffice.)

49,000 British Columbia edge grain Red Cedar shingles (196 bundles)

900 feet, board measure, 1" V-joint, for doors, in 10-ft., 14-ft. and 16-ft. lengths.

6,000 feet, board measure, siding.

17 sashes, 3 lights, 12" x 16"; outside measurement, 3' 4¼" wide x 1' 9" high.

2 sashes, 4 lights, 8" x 8"; outside measurement, 1' 8½" wide x 1' 8½" high.

4 sashes, 6 lights, 12" x 14"; outside measurement, 3' 4½" wide x 2' 9" high.

30 rolls of tar paper.

Hardware

25 lbs. 5" spikes.

300 lbs. 4" common nails.

80 lbs. 2½" flooring nails.

35 lbs. 2" finishing nails.

400 lbs. 2½" common nails.

120 lbs. 2" flooring nails, for siding.

- 245 lbs. $1\frac{1}{4}$ " shingle nails, galvanized, zinc clad, or cut iron.
- 2 round iron rods, $\frac{3}{8}$ " x 24" long, for pivots to ventilator dampers.
- 16 iron brackets, for locking bars.
- 10 pairs 18" strong T hinges, for loft doors.
- 19 pairs 4" T hinges, for sashes.
- 19 window fasteners.
- 4 pairs 4" T hinges, for feed bins.
- 3 pairs 8" T hinges, for trap doors.
- 10 pairs 12" T hinges, for ground floor doors.
- 2 pairs 8" T hinges, for feed room doors.
- 2 barn door latches.
- 2 thumb latches.
- 40 iron bolts, $\frac{5}{8}$ " x 10", with double washers, for bolting sills to concrete foundation.
- 8 iron bolts, $\frac{1}{2}$ " x 6", for locking bars.
- 35 yards of gravel, for foundation.
- 200 bags of cement, for foundation.

Note.—This bill of material includes everything necessary for the building itself, but does not include anything for scaffolding. Alternative quantities are given for two methods of roof boarding—close and open—the choice being left to the builder. Close boarding is better where there is no hay loft over the animals; where hay lofts are shown, open boarding will answer.

Steer Feeding Barn No. 4.

The type of barn shown in this plan is one that is popular with many feeders. It is 52 feet 10 inches by 60 feet, and will house comfortably about 48 head of cattle. Two pens, 17 feet 9 inches wide, for loose stock, run the entire length of the barn on each side of the central driveway or hay-mow. These pens have earth floors, are equipped with double doors at each end for hauling bedding and manure, and have a continuous manger placed on the driveway side of the partition wall. The divisions in the manger

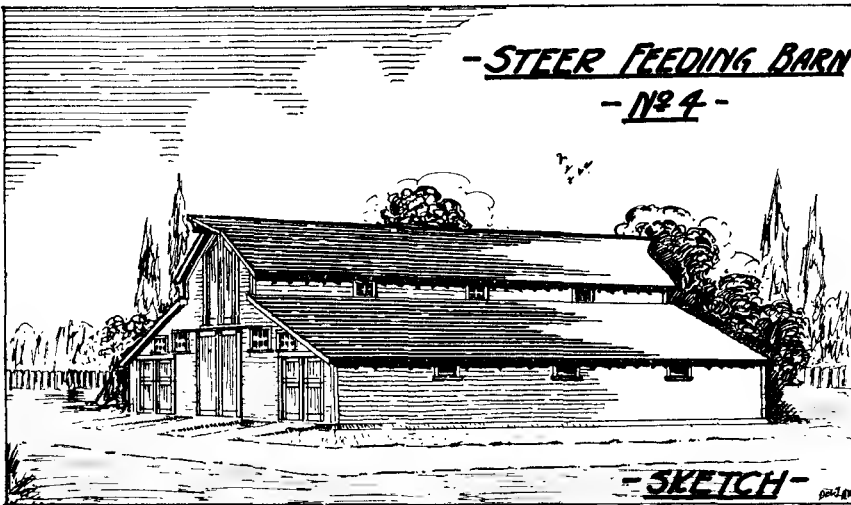


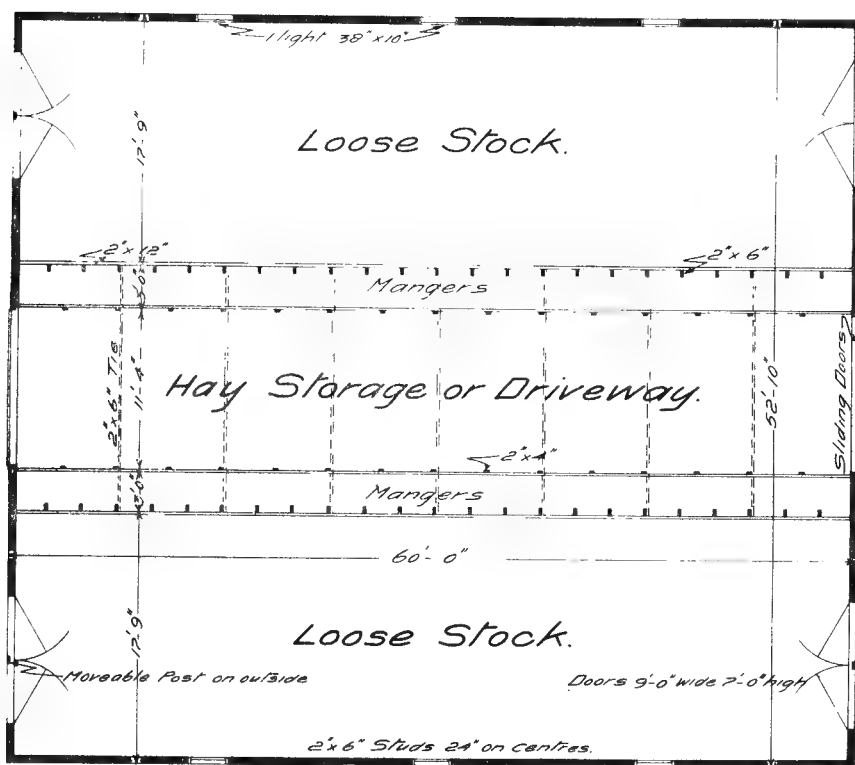
Fig. 10. Two lean-to sheds against a hay mow. Room for 48 head and for half a winter's supply of hay. The cost per head for housing is very low.

are formed by the 2" x 6" studs, which are spaced far enough apart (2 feet 5 inches) to leave ample room for the cattle to put their heads between when feeding.

The central part of the barn, which is 11 feet wide between the mangers and 16 feet high at the plate, can be used either as a driveway or as a hay-mow. If used as a driveway, all the feed can be hauled in wagons through the large end doors and put directly into the mangers. If used as a hay-mow, a hay fork can be installed and the whole space between the mangers filled with hay or fodder. The sides of the hay-mow are formed by partitions which stand in

front of the mangers and which serve to keep the space above the mangers clear of hay when filling the mow. These partitions consist simply of an open framework of studs with a few horizontal pieces nailed across them; thus, at any level of the mow, hay can

Steer Feeding Barn No 4. Scale $\frac{1}{4}$ " = 1'-0"



Plan.

Fig. 11. A wagon can be driven through each lean-to for bedding and cleaning; and also through the central driveway for feeding when the mow is empty of hay.

easily be put through the openings in the partitions down into the mangers.

When there is hay in the central space, grain and roots—if they are to be fed in addition to roughage—can be hauled through the cattle pens to the mangers, or to grain tables, as shown in Fig. 17.

Scale



Fig. 12. The sides of the hay mow are simply open frame-work, through which the hay is pitched into the mangers. The space above the mangers thus forms a continuous hay chute, and feeding can be done with a minimum of labor.

Bill of Materials, Steer Feeding Barn No. 4.

Framing Lumber

No. of Pcs.	Inches Thick	Inches Wide	Feet Long	Feet, Board Measure	USED FOR
2	6	8	10	80	Projecting hay fork beams at each end of barns.
*20	4	6	16	640	Sills on ground under studs.
* 2	4	6	14	56	Sills on ground under studs.
* 8	4	4	16	171	Sills under 2" x 4" uprights between manger and centre alley.
* 8	2	10	16	213	Manger fronts.
*16	2	10	16	427	Manger bottoms.
2	2	8	16	43	Window sills.
* 5	2	8	14	93	Ridge pole.
7	2	8	8	75	Window sills.
66	2	6	20	1,320	Rafters to lean-to, 24" centres.
8	2	6	20	160	Studs and door trimmings for end walls.
9	2	6	18	162	Cross ties, 10 feet above ground, connecting 2" x 6" studs.
4	2	6	18	72	Studs and door trimmings for end walls.
12	2	6	16	192	Studs and door trimmings for end walls.
*16	2	6	16	256	Roof plate on 2" x 6" studs, doubled to make 4" x 6".
*24	2	6	16	384	Purlins under rafters to lean-to roof.
					Ribbons under rafters to lean-to roof.
					Ribbons under struts to lean-to roof.
* 8	2	6	16	128	Ties from 2" x 6" uprights to 2" x 4" uprights over mangers.
50	2	6	16	800	Studs, centre alley, at 30" centres.
8	2	6	14	112	Stiles to cattle doors.
4	2	6	14	56	Door frames.
4	2	6	14	56	Studs and door trimmings for end walls.
8	2	6	12	96	Studs and door trimmings for end walls.
66	2	6	12	792	Rafters to centre alley at 24" centres.
2	2	6	12	24	Door frames.
14	2	6	10	140	Door frames.
4	2	6	10	40	Fixing for roller door track.
3	2	6	10	30	Rails to roller doors.
8	2	6	10	80	Stiles to roller doors.
8	2	6	10	80	Stiles to hay fork doors.
20	2	6	10	200	Rails to cattle doors.
12	2	6	10	120	Studs and door trimmings to end walls.
20	2	6	8	160	Studs and door trimmings to end walls.
6	2	6	8	48	Rails, hay fork doors.
4	2	6	8	32	Braces, hay fork doors.
4	2	6	8	32	Braces, cattle doors.
8	2	6	6	48	Braces to roller doors.
66	2	6	6	396	Studs, side walls of lean-to at 24" centres.
31	2	6	6	186	Collar ties to carry hay fork track.
*16	2	6	16	256	Roof plates of side walls, doubled to make 4" x 6".

Framing Lumber—Continued

No. of Pcs.	Inches Thick	Inches Wide	Feet Long	Feet, Board Measure	USED FOR
* 8	2	4	16	85	Head rails over mangers.
*15	2	4	16	160	Framing and bearers for mangers.
4	2	4	8	21	Locking bars to cattle doors, to cut 4 pieces.
30	2	4	12	240	Studs between mangers and centre alley.
15	2	4	16	160	Studs between mangers and centre alley.
7	2	4	10	47	Braces under 2" x 6" cross ties, to cut 14 pieces 5' 0" long.
8	2	4	10	53	Guides fixed on sills for roller doors.
2	2	4	10	13	Locking bars to hay fork doors.
22	2	4	8	117	Struts under purlin of lean-to roof.
*24	1	10	16	320	Horizontal rails on 2" x 4" uprights on centre alley side of mangers. (These are to prevent hay stored in centre alley from falling through.)
*16	1	8	16	171	Frieze at eaves.
4	1	8	20	53	Fascia at gables.
4	1	8	12	32	Fascia at gables.
* 8	1	6	16	64	Ribbon under 2" x 6" cross ties to centre alley.
4	1	6	20	40	Frieze at gables.
4	1	6	12	20	Frieze at gables.
* 5	1	6	14	35	Ridge cover boards.
4	1	6	14	28	Door casing.
2	1	6	12	12	Door casing.
14	1	6	10	70	Door casing.
4	1	6	10	20	Cover boards to roller door track.
4	1	6	8	16	Corner boards.
* 5	1	5	14	29	Ridge cover boards.
4	1	5	8	13	Corner boards.
4	1	4	16	21	Window casing.
4	1	4	14	19	Window casing.
6	1	4	12	24	Window casing.
16	1	4	10	53	Window casing.
*25	1	2	20	83	Door and window stops.
Total Framing Lbr. 10,275					

***Random lengths** to make up the same total number of lineal feet will answer for these items, and are cheaper than specified lengths.

Short lengths (less than 10 ft.) are cheaper than long lengths (10 ft. and over), and where they will answer the purpose it pays to specify them. For example, it is cheaper to buy 6 and 8 foot lengths than to cut them out of 12 and 16 foot lengths.

- 800 feet, board measure, 2" planks, for backs of mangers.
- 3,300 feet, board measure, siding.
- 2,800 feet, board measure, 1" roof boarding, laid open.
- 850 feet, board measure, 1" V-joint, in 10 and 14-ft. lengths, for doors.
- 40,000 British Columbia edge grain Red Cedar shingles (160 bundles).
- 6 sashes, 1 light, 38" x 10"; outside measurement, 3' 6" wide x 1' 2" high, for side walls of lean-to.
- 16 sashes, 4 lights, 8" x 10"; outside measurement, 1' 8½" wide x 2' 1" high, under roof plates in centre alley.
- 4 sashes, 6 lights, 12" x 14"; outside measurement, 3' 4½" wide x 2' 9" high, in end walls of lean-to.
- 4 sashes, 6 lights, 12" x 10"; outside measurement, 3' 4½" wide x 2' 1" high, in end walls of lean-to, over doors.

Hardware

- 200 lbs. 4" common nails.
- 70 lbs. 2" flooring nails, for siding.
- 200 lbs. 1¼" galvanized, zinc clad, or cut iron shingle nails.
- 100 lbs. 2½" common nails.
- 40 lbs. 3½" common nails.
- 70 lineal feet hay fork carrier track.
- 8 iron sockets, for cattle door locking bars.
- 4 iron sockets, for hay fork door locking bars.
- 6 iron bolts, ½" x 6", for locking bars.
- 40 lineal feet single track for roller doors (4 lengths 10 feet).
- 8 roller door hangers.
- 30 pairs 4" T hinges, for windows.
- 30 window fastenings.
- 18 hooks and eyes, 6".
- 22 pairs 18" T hinges, for doors.

Note.—This bill of material includes everything necessary for the building itself, but does not include anything for scaffolding.

Roof Framing.

Fig. 13 illustrates roof framing suitable for barns from 32 feet to 40 feet wide. The roofs shown are economical in material, simple in construction and strong, and supporting posts are unnecessary, thus allowing a clear storage space in the hay-mow.

The illustrations give the lengths and sizes of the various roof timbers. It will be noticed that no timber is longer than 16 feet, or of greater size than 2 x 6 inches (except the short 2 x 8 inch struts).

One complete set of timbers for the roof should first be laid out on the hay loft floor, and all joints very carefully marked and cut. This complete set should then be used as a pattern for all the other roof timbers, which should be cut and stacked in piles before any are erected. In cutting off lengths of rafters, etc., in order to have all lengths accurate, always work to the pattern and not to the last piece cut.

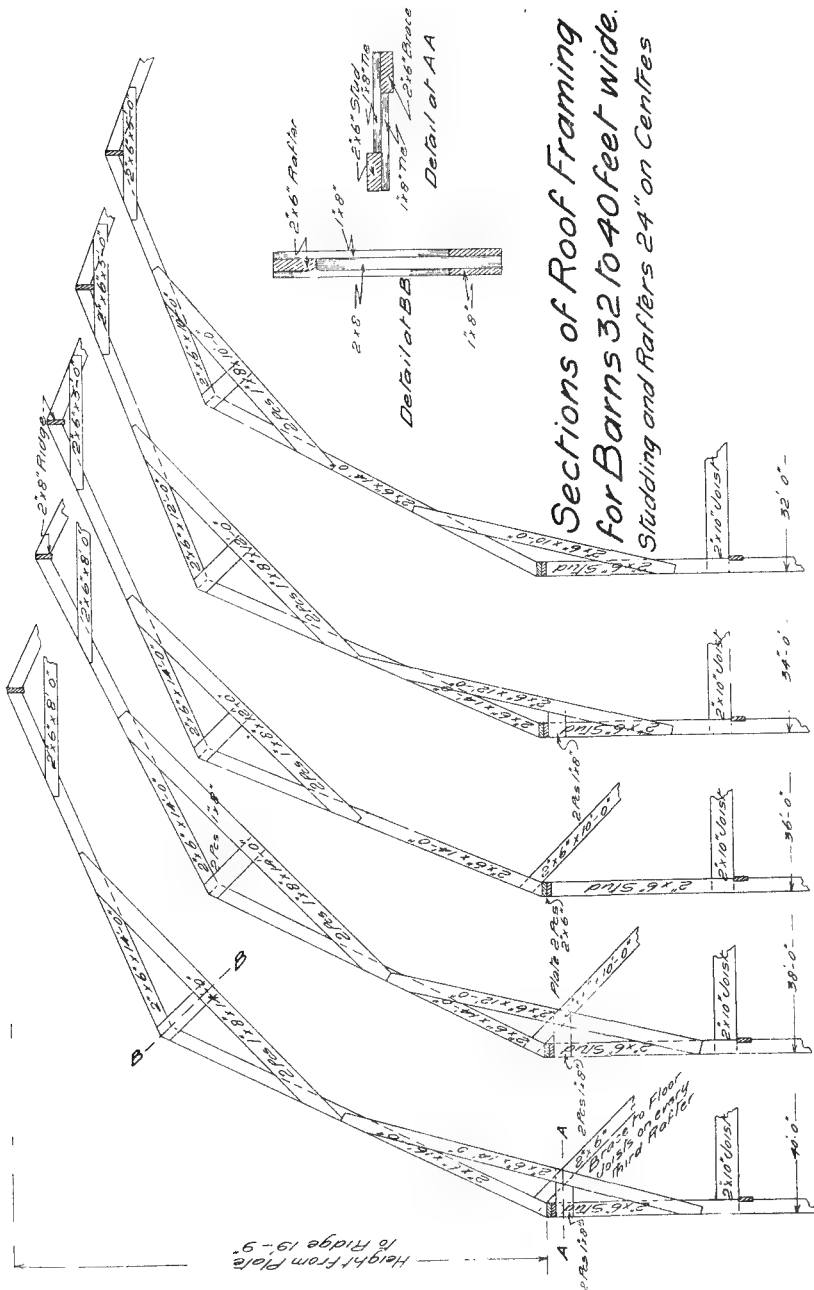


Fig. 13. Roofs that give lots of storage room and are simple, cheap and strong. No timber is longer than 16 feet or larger than 2" x 8".

MANGERS AND STALLS.

Cow Stalls.

Fig. 14 illustrates a good type of single cow stall, simple in design and easy to build. The stall divisions are made of 2 inch

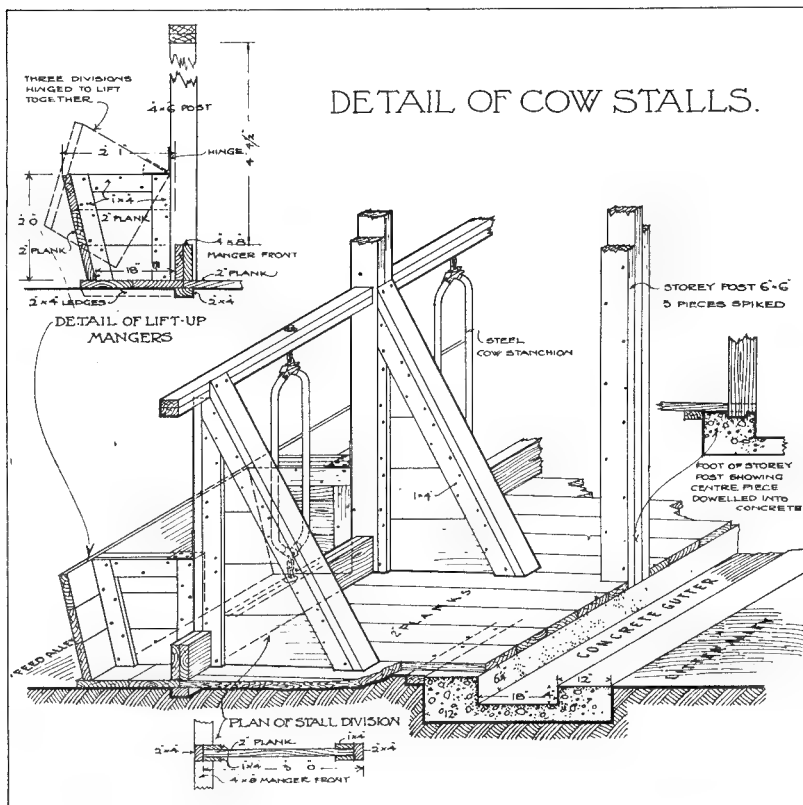


Fig. 14. A simple and serviceable single stall. The lift-up manger makes thorough cleansing easy.

planks, with 1 x 4 inch cleats on both sides; they will be found to leave ample room for the milker and at the same time are wide enough to prevent the cows from crowding or hooking each other. The lift-up manger is very convenient in allowing easy and thorough cleansing of the floor forming the manger bottom.

Cattle Mangers.

In Fig. 15 three types of cattle mangers are shown, and also one type of stall division for cows stabled in pairs.

No. 1 is a fixed or stationary manger for a box stall, and is especially suitable for bulls and steers. It is partly in the stall and

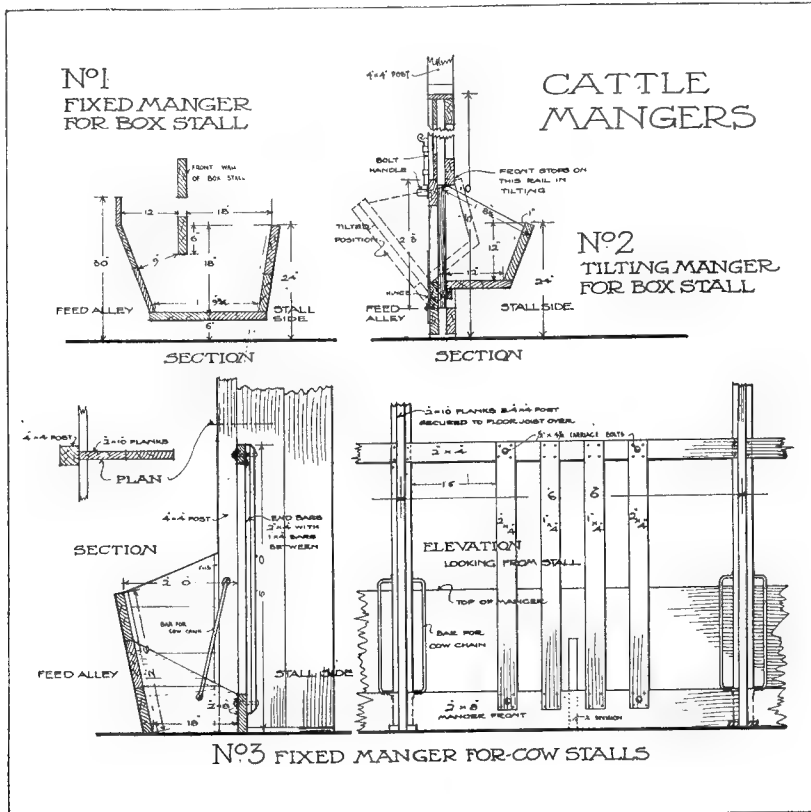


Fig. 15. Mangers that are easy to make and convenient to use.

partly in the feed alley, thus making it easy to put in feed from the alley without entering the stall. The partition or rail which comes down below the level of the manger top holds the roughage in place and prevents the animal from throwing it out. The manger is of good size; in fact three or four yearlings could feed out of it together.

Manger No. 2 is also intended for box stalls. It is known as a tilting manger and is hinged at the bottom so that it can be drawn forward for putting in the feed; it drops back into position by its own weight. It is necessarily shallow and rather wasteful of feed, as there is nothing to prevent the animals from pushing the roughage out onto the floor. It is intended for use only where the feeding alley is so narrow that a projecting manger like No. 1—which is in general a more satisfactory type—would be in the way.

No. 3 is a type of fixed manger suitable for double stalls. The manger itself is simple in construction, the main features being the method of tying and the divisions between the stalls. The iron bar to which the cow's chain is attached is fixed slantwise to the side of the stall and manger partition, the lower end of the bar being placed some six inches farther forward than the top. This helps to keep the cow clean because as she lies down, the chain naturally drops downward and forward and draws her well up toward the manger and away from the gutter.

The narrow division between the stalls is made of two planks fixed upright from floor to ceiling. It extends back from the manger plenty far enough to prevent the cows from hooking each other, but not far enough to be in the way of the cows when lying down, or of the attendants when milking.

Calf Stanchion.

Fig. 16 illustrates a simple stanchion of the rigid type. It is intended for use only while the calves are fed, and for a short time afterwards to prevent them from forming the habit of sucking each other's ears, which often occurs when they feed in loose pens. The stanchion and manger are all made from inch boards. The pivoted uprights are operated by a straight iron bar, the position and fixing of which is clearly shown in the illustration.

Portable Grain Table.

Fig. 17 shows a portable grain table which can be used to advantage where a number of steers are being fed in yards or loose in sheds. It can be built any size desired, but the dimensions given on the plan will prove suitable in most cases. These tables have several advantages over the deep or narrow manger in which grain

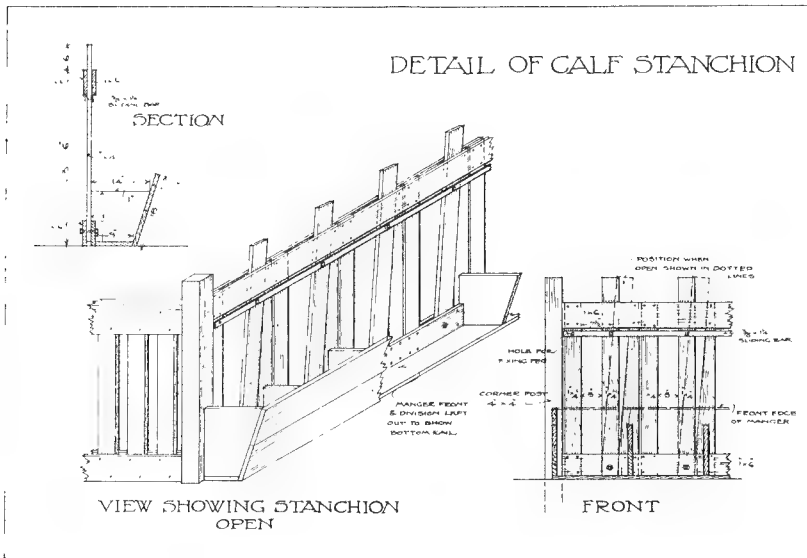


Fig. 16. Intended to hold the calves while they are being fed.

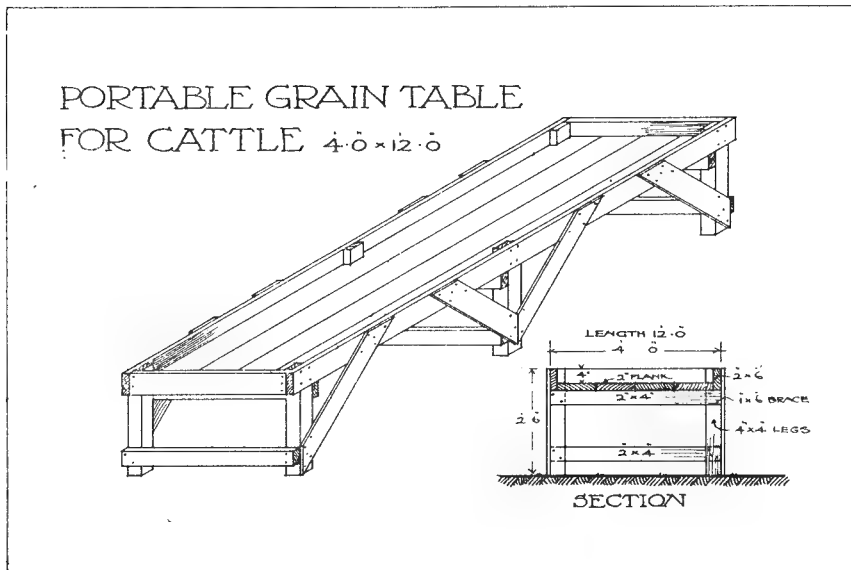


Fig. 17. A sturdy table for use in yards or sheds. Better than deep narrow mangers.

is often fed. They are easily cleaned, will allow a large number of steers to feed at once, and give more equal distribution of the feed, because the grain can be spread out in a comparatively thin layer over the entire surface. The table must be strongly built and well braced to withstand the strain it is subjected to when heavy steers are feeding.

Bill of Materials, Portable Grain Table for Cattle.

No. of Pcs.	Inches Thick	Inches Wide	Feet Long	USED FOR
1	4	4	16	To cut 6 legs, 2' 6" long.
2	2	10	12	Table planks.
3	2	8	12	Table planks.
2	2	6	12	Table sides.
1	2	6	8	Table ends.
3	2	4	8	Cross bearers, fixed to legs.
4	1	6	8	To cut 8 side braces.

Hardware

3 lbs. 3½" common nails.
 3 lbs. 4" common nails.
 1 lb. 2½" common nails.

Portable Self Feeder.

Self feeders of the type shown in Fig. 18 can be placed in paddocks or yards, filled with roughage, straw, hay or green feed, and the cattle allowed to eat at will from them. The hopper

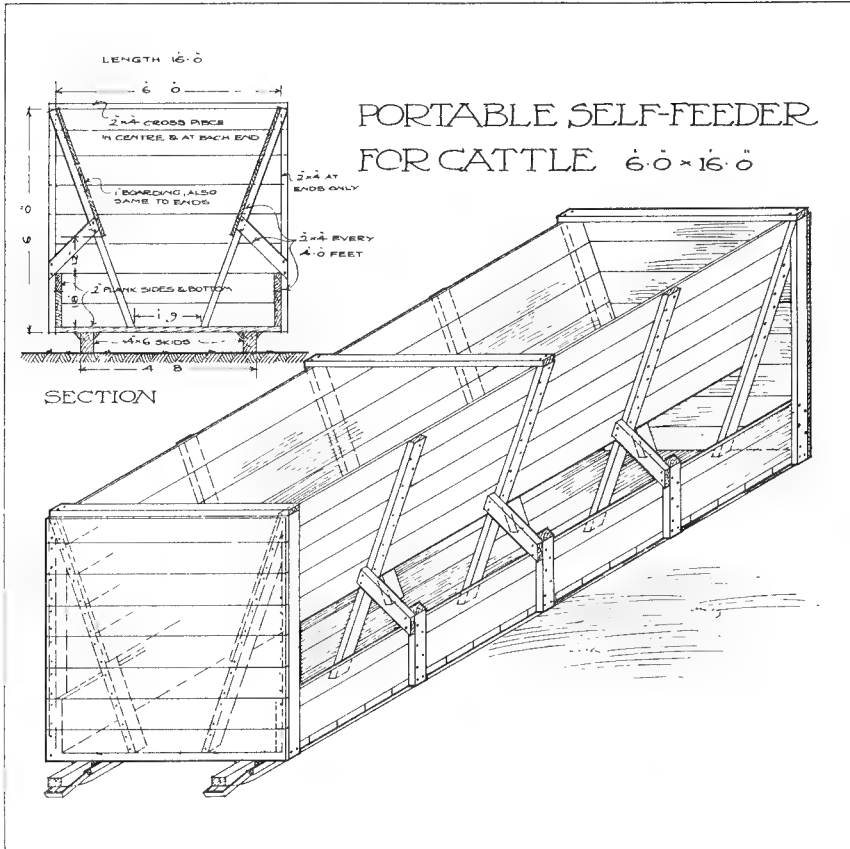


Fig. 18. A very useful device for feeding cattle in paddocks or yards. The hopper bottom prevents waste of fodder.

bottom prevents the fodder from being wasted, as is the case where an open manger is used. Where several of these are used they need be filled only once a week or so, the frequency depending upon the size of rack and number of cattle feeding from it. They can be built in any desired length, but 12 to 16 feet is as a rule most satisfactory, as longer ones are difficult to move.

Bill of Materials, Portable Self Feeder for Cattle.

No. of Pcs.	Inches Thick	Inches Wide	Feet Long	USED FOR
2	4	6	18	Skids.
6	2	6	16	Sides.
5	2	4	14	To cut 10 pieces for bearers to sloping sides.
2	2	4	12	To cut 12 pieces for short uprights to sides and ties from fronts to sloping sides.
7	2	4	6	4 pieces for uprights at corners; 3 pieces for ties across top.
2	2	2	16	Cut diagonally to form blockings on both sides of skids under flooring.

200 feet, board measure, 2" plank, 6-ft. lengths.

128 feet, board measure, 1" boarding, in 16-ft. lengths, for sloping sides.

72 feet, board measure, 1" boarding, for ends, in 6-ft. lengths.

Hardware

4 wrought iron hauling straps and bolts, fixed at ends of skids.

7 lbs. 4" common nails.

10 lbs. 2½" common nails.

Barn Ventilation.

Fresh air ranks with sunlight as one of the prime necessities in any building used for the housing of live stock. Too much stress cannot be laid upon this point. Foul air is certain to cause disease. A stable lacking proper ventilation is neither sanitary nor comfortable. Low temperature does not mean pure air, and the purity of the air in a stable cannot be judged by its temperature.

The necessary conditions in a good ventilation system are: (1) No animal should be in a direct draught. (2) Each animal should get a sufficient amount of fresh air; no animal should be in a corner or a space where the fresh air does not circulate and from which the foul air is not carried off. (3) The currents of air should all be in the one direction—that is, away from the cold walls and towards the outlets. (4) The ventilators should be easily controlled so that in extremely cold weather the temperature need not be unduly lowered.

The Rutherford system of ventilation is used in all the barns shown in this bulletin. It is one of the best in use, and is recommended by most authorities in Canada. In this system the

fresh air is brought in through a number of small openings or ducts at the bottom of the outside walls, so distributed that fresh air is diffused throughout all parts of the stable. These ducts are generally raised up inside to about eight inches above the floor, so that cold draughts will not run along the floor. As it is used and becomes warmed the air moves gradually to the centre of the building and up to the ceiling and out through the outlets. There should be no cross current nor tendency to bring air once breathed and warmed in contact with the outside wall. Usually about one outlet is provided for every four inlets.

Where the mangers are against the wall it is sometimes difficult to introduce the air without causing a draught on the animals. In an experiment carried on at the Central Experimental Farm, Ottawa, to avoid this difficulty the fresh air was carried underneath the floor of the stall. Where this is done care must be taken to have the air shaft absolutely water tight. This can be ensured by using vitreous tile pipe with cemented joints. If the air is brought in at the manger it should be broken up into very small openings (auger holes), so as not to create a draught. If there is a feed passage along the wall it makes an excellent place for bringing in the fresh air.

The air should be brought in through small openings and at frequent intervals. An opening should not be larger than six inches by eight inches. Six or four inch tile pipes make good ducts. Eight square inches of inlet should be allowed for each cow two years old and over, and ten to twelve square inches for each horse. The inlets should be placed along the walls so that they will distribute the fresh air as far as possible throughout the entire stable. The inlets on the outside of the walls should be carried up high enough to be above the snow line and also to prevent dust and rubbish from blowing into them. The openings should be on the side walls of the inlet and not the face so that strong winds will not blow directly into them and affect the ventilation within the barn. Fly screens should be put over the openings.

The currents of air should be all in one direction — that is towards the outlets. The air breathed out by animals is heavily laden with moisture. If this moisture laden air is kept too long

in contact with a cold wall or ceiling surface the moisture will be deposited in the form of hoar frost, and the next mild day the walls will begin to drip. There is nothing so uncomfortable as a wet barn. When an animal gets its coat wet it has to supply sufficient animal heat to evaporate the moisture. That this waste of heat—or in other words food—is considerable is shown by the fact that it takes five and one-third times as much heat to evaporate water as it does to bring it from the freezing to the boiling point. In this connection the construction of the walls is very important. Unless they have some form of insulation such as a dead air space, it is impossible to keep them dry, except by lowering the inside temperature to approximately the same as the outside. Double walls with a dead air space between will keep dry if there is a good circulation of air in the stable. No system of ventilation will keep solid stone or cement walls dry—especially in very cold weather—unless they are wood lined. (See Bulletin 78, Dept. of Agriculture, Ottawa).

The outlets should be not less than 16 inches in diameter, and 24 inches is preferable. About 20 square inches of outlet space should be allowed for each animal. The outlets should be located as near the centre of the barn as possible. They should be built of two-ply lumber with tar paper between, to make them as air tight and as warm as possible. The air that is carried up the outlets is full of moisture, and if the outlet is cold it will soon collect a lot of hoar frost. The outlet should be built with as few angles as possible and be carried above the ridge in the form of a cupola. In the cupola it is preferable to have the sides open rather than covered with slats. If the roof is carried well over the walls there is not much danger of the snow and rain beating in the open sides.

The ventilation system should be easily controlled. The higher the ventilator is carried the greater the amount of air it will take out of the barn. Also the greater the difference in the temperatures between the inside of the stable and the outside, the more air will be carried off. Consequently it is necessary to control the outlets with a damper, the controlling cords of which should be brought down into the stable for convenience. The exact amount of opening for different weather conditions is soon learned, and it is only

a minute's job to adjust two or three ventilators before leaving for the night.

No ventilating system is automatic for all conditions of wind and temperature, but the Rutherford system can be operated with a minimum of attention and has proved to be most successful for conditions in the West.

BRITISH COLUMBIA DEPARTMENT OF LANDS
FOREST SERVICE.

HON. WILLIAM R. ROSS, K. C., *Minister of Lands.*

Wood as a Building Material

Wood is supreme for **all-round usefulness**.

It is the **cheapest** building material obtainable.

It is also the **lightest**.

It is the **strongest**, weight for weight.

It is the **easiest** to work; **any one** can use it.

A wooden building is by far the **simplest** to **erect**.

Wood is **attractive in appearance** and has **great variety** and **beauty** for interior finish.

Unlike metal and masonry, wood is almost a **non-conductor** of **heat** and **cold**.

A building with wooden walls and a wooden shingle roof is **warm** in winter and **cool** in summer and **dry** all the time.

Wood is therefore particularly **suitable** for **houses** and **barns**.

Wood is very **durable** in all kinds of building work **above ground**.

It will give **generations** of service, especially if well painted where exposed to the weather.

For use in **contact** with the **soil**, as mud-sills or fence-posts, a preservative should be applied or a specially resistant wood, such as Western Red Cedar, should be used.

Woods to Use

GROWN IN BRITISH COLUMBIA—MANUFACTURED IN
BRITISH COLUMBIA.

Woods differ in their qualities of strength, hardness, and durability. Certain kinds are particularly suited for certain uses. It is important to use the right wood in the right place.

(1.) **General Building Work** — Douglas Fir, Western Larch, Western Hemlock, Mountain Western Pine, Mountain and Coast Spruce, Western White Pine.

(2.) **Framing and Dimension Timber, Posts, Beams, Rafters, Studs, Sills, Plates, Joists.**—Light construction: Same as No. 1. Heavy construction: Douglas Fir, Western Larch, Western Hemlock.

(3.) **Rough Lumber or Sheathing not exposed to Weather (Inside Work or covered by Siding or Lath and Plaster).**—Any British Columbia wood.

(4.) **Rough Outside Sheathing exposed to Weather (Outbuildings, etc.)**—Douglas Fir, Western Larch, Mountain Western Pine, Western Red Cedar, Coast and Mountain Spruce, Western White Pine.

(5.) **Siding.**—Western Red Cedar, Douglas Fir, Mountain Western Pine, Mountain and Coast Spruce.

(6.) **Roofing.**—Western Red Cedar edge-grain shingles, with galvanized, zinc-clad, zinc, or copper nails.

(7.) **Flooring, Stair Stepping, Sidewalks.**—Douglas Fir, Western Larch, Western Hemlock. Use edge-grain stock for hardest wear.

(8.) **Interior Finish, Panelling, Trim.**—Douglas Fir, solid or veneer (a beautiful grain, superior to most hardwoods), Western Larch, Western Hemlock, Western Red Cedar, Mountain Western Pine, Western White Pine.

(9.) **Doors, Window-sash.**—Douglas Fir, Western Red Cedar, Western Larch, Mountain Western Pine, Western White Pine.

(10.) **Fence-pickets.**—Douglas Fir, Western Larch, Western Red Cedar, Mountain Western Pine.

(11.) **Piling, Cribbing.**—Douglas Fir, Western Larch.

(12.) **Silos, Tanks.**—Douglas Fir, Western Larch, Western Red Cedar.

(13.) **Ground-sills, Skids, Fence-posts, Poles, Conduits, Drains, and wherever Wood is in Contact with the Ground.**—Western Red Cedar or creosoted wood. Use Douglas Fir or Western Larch where strength and hardness are essential.

(14.) **Furniture, Tables, Settees, etc.**—Douglas Fir, Mountain Western Pine, Coast or Mountain Spruce, Western White Pine, Western Red Cedar.

Note.—Western Hemlock is superior in every way to Eastern Hemlock—an entirely different tree—and should not be confused with it.

BRITISH COLUMBIA FOREST SERVICE BULLETINS.

Farm Buildings Series.

1. Combination or General Purpose Barns for Prairie Farms.
2. Dairy Barns, Milk and Ice Houses for Prairie Farms.
3. Beef Cattle Barns for Prairie Farms.
4. Horse Barns for Prairie Farms.
5. Sheep Barns for Prairie Farms.
6. Piggeries and Smoke Houses for Prairie Farms.
7. Poultry Houses for Prairie Farms.
8. Implement Sheds and Granaries for Prairie Farms.
9. Silos and Root Cellars for Prairie Farms.
10. Farm Houses for Prairie Farms.

Timber Series.

11. British Columbia Box Woods.
12. How to finish British Columbia Woods.
13. British Columbia Tie Timber.
14. British Columbia Dimension Timber.

These bulletins are obtainable free from Victoria. Of the Timber Series, Bulletin No. 12, "How to finish British Columbia Woods," is of special interest to home builders and owners, carpenters, architects, and building contractors. Further information concerning British Columbia timber may be obtained by writing to the Chief Forester, Victoria, B.C.

OTHER PUBLICATIONS.

Many publications and much useful information on farming and related subjects can be obtained on request from the various Government Public Service organizations of Canada, listed below.

(1.) **Alberta:**

Department of Agriculture, Edmonton.
University of Alberta, Edmonton.
Agricultural Schools at Olds, Vermilion, and Lethbridge.
Dominion Experimental Stations at Lethbridge, Lacombe, and Fort Vermilion.

(2.) **British Columbia:**

Department of Agriculture, Victoria, B.C.
Dominion Experimental Farm, Agassiz, and Experimental Stations at Sidney, Salmon Arm, Summerland, and Invermere.

(3.) **Dominion:**

Department of Agriculture, Ottawa, Ont.
Dominion Forestry Branch, Ottawa, Ont.

(4.) **Manitoba:**

Department of Agriculture, Winnipeg.
Manitoba Agricultural College, Winnipeg.
Dominion Experimental Farm, Brandon, and Experimental Station at Morden.

(5.) **Saskatchewan:**

Department of Agriculture, Regina.
University of Saskatchewan, Saskatoon.
Dominion Experimental Farm, Indian Head; Forestry Station, Indian Head; and Experimental Stations at Scott and Rosthern.

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